



Environmental Management System

# Beyond ISO 14001 Certification: Getting More From an EMS

Dennis L. Hjeresen  
Director, Risk Reduction  
Los Alamos National Lab  
August 2009





# BIO

- Dr. Dennis L. Hjeresen currently serves as Director of the Office of Risk Reduction for Los Alamos National Laboratory in New Mexico. He is responsible for implementation of a preventive strategy to achieve regulatory compliance. This includes programs in environmental sustainability managed through an ISO 14001 registered Environmental Management System (EMS).

*Safety for You, Security for the Nation, Environment for our Future*



# Independent Third-Party Registration

- LANL ISO was certified to the 14001:2004 standard in April 2006
- Surveillance Audits Oct 06, Apr 07, Oct 07, Apr 08, Oct 08
- Recertified in April 2009
- 81 Audit days to date



A Subsidiary of NSF International  
789 North Dixboro Road, Ann Arbor, Michigan 48105  
(888) NSF-9000

***Certificate of Registration***  
This certifies that the Environmental Management System of  
**Los Alamos National Laboratory**  
Mail Stop M992  
Los Alamos, New Mexico, 87545 USA  
has been assessed by NSF-ISR and found to be in conformance to the following standard(s):  
**ISO 14001:2004**

**Scope of Registration:**  
Research and Development concerning National Security.

**Industrial Classification:**

IAF: 35  
SIC: 87  
NACE: K 74

Certificate Number: 7Y571-E1  
Certificate Issue Date: 04/11/2006  
Company Initial Date: 03/24/2006  
Registration Date: 03/24/2006  
Expiration Date\*: 03/23/2009

*Christian B. Lupo*  
Christian B. Lupo, General Manager  
NSF-ISR, Ltd.

Authorized Registration and/or Accreditation Marks This certificate is the property of NSF-ISR and must be returned upon request. \*Company is audited for compliance at regular intervals. To verify registration call (888) NSF-9000 or visit our web site at [www.nsf-iso.org](http://www.nsf-iso.org).



# Using an EMS Once Implemented

- Bidirectional Approach
- Bottoms Up
  - Each Directorate (15) has nested team that conducts risk analysis, develops action plan to address priorities and makes improvement actions at local level
  - Nearly 600 local environmental improvement actions in FY06/07
  - 454 new local improvement actions in FY08-09
- Process identifies institutional problems beyond local capabilities and resources
- Environmental Senior Management Steering Committee reviews and approves proposed institutional objectives and targets

*Safety for You, Security for the Nation, Environment for our Future*

# Laboratory ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

## Annual process of Performance Measurement & Continuous Improvement

**Inputs to Institutional objectives, targets & performance indicators process**

Contractual & Regulatory Requirements

Existing Goals, Objectives, Targets, & Key Performance Indicators, PBI's

ENV Division environmental expertise

Directorate Significant Environmental Aspects and Objectives

Changing customer needs, institutional requirements, and annual reviews

**Directorates**

revise Action Plans with Objectives, Targets, & Performance Indicators traceable to individuals

**Steering Committee**

Review & approve recommended Institutional Environmental Objectives, Targets, & Division Performance Indicators

**EMS Management Team**

Review Action Plans to identify recommended institutional environmental objectives, targets, & performance indicators

**EMS Core Team**

Review & refine recommended institutional environmental objectives, targets, & performance indicators



# Institutional Objective & Targets

- Ensure Environmental Compliance
- Site-wide Materials and Equipment Disposition
- Energy and Fuel Conservation
- Zero Liquid Discharge by 2012
  - Outfall Reduction Program
- Rad and Hazardous Waste Reduction

*Safety for You, Security for the Nation, Environment for our Future*



- Environmental Requirements briefings to:
  - Work Planners
  - Subcontract Technical Representatives
  - Deployed Environmental Generalists
  - ESH&Q Managers
- RCRA Training Walkaround Program
  - Managers and workers
  - Non-designated space focus
- Active integration with safety & security compliance programs
  - Blending at local level
  - WSST doing EMS
- Zero State findings in 09

## ESS News

Environment for the Future  
Safety for You  
Security for Our Nation Issue 4

**ENVIRONMENT** Send your green ideas to the EMS Help Desk  
[ems@lanl.gov](mailto:ems@lanl.gov) or call us: 7-7912

All LANL employees interact with the environment. When you use, buy, or dispose of water, energy, paper, chemicals, vehicles, or equipment you interact with the environment.


☑ The Environmental Management System (EMS) is a tool to help minimize your environmental impacts, reduce cost, and increase your work efficiency.

☑ In addition to completing the necessary training, find out how you can help LANL meet its environmental goals by reviewing your directorate's EMS Action Plan at [www.ems.lanl.gov](http://www.ems.lanl.gov). You can make a difference!

☑ LANL projects and employees received 64 Pollution Prevention Awards in 2008 for reducing LANL's environmental impacts.

**SAFETY** Safety Help Desk, [safety@lanl.gov](mailto:safety@lanl.gov), 5-7233

**Stair Safety – Stairs have their ups and downs – don't let them trip you up!**



**Here are some things to keep in mind:**

- Walk each step – and ALWAYS use the handrail.
- Don't skip steps, and never run.
- Check each step, and watch for uneven steps.
- When moving down, don't miss a step and slip.
- When going up, don't catch a lip and trip.
- If you are carrying a load, make sure you can see where you are going, and ALWAYS keep one hand free for the handrail.

**SECURITY** Security Help Desk, [security@lanl.gov](mailto:security@lanl.gov), 5-2002

**Your New Federal Security Badge**

The new federal security badge for eligible cleared workers is embedded with a microchip that contains personal information, including an electronic fingerprint and digital image.


**Protect Your Privacy**

Your new badge is issued with an electromagnetically opaque sleeve, which protects it from being "pinged" or accessed without proper authorization. Your badge should be kept in the sleeve at all times unless you are showing it to a Protective Force officer or swiping it in a badge reader.

**Protect Your Badge**

**DO NOT:**

- Expose your badge to excessive heat, cold, or moisture
- Mark, punch holes in, or bend your badge
- Scratch your badge's magnetic stripe
- Use your badge as a window scraper
- Expose your badge to magnetic energy
- Make or allow anyone else to make photocopies of your badge



For more information visit the New Badge Website:  
<http://int.lanl.gov/security/newbadge/>  
LA-UR 09-01052



# Excess Materials & Equipment



- EMS process identified large scale storage of excess equipment, materials and chemicals
- Major safety, security, property and environmental risks identified
- New Lab-wide effort chartered to address life-cycle of hazardous materials and equipment

*Safety for You, Security for the Nation, Environment for our Future*





# Addressing Institutional Systems

- Departures Process
- Haz-Mat incident root causes
- RCRA & environmental non-compliances
- Lack of controlled storage
- Facility ownership
- Loss of AK / use history
- Over-buying / under utilization of existing stores



# System Improvements

- New single vendor contract
- Improved Chemlog electronic inventory program
- Eased chemical transfer procedures to increase the reuse of excess materials
- Flagging Environmental High Risk Chemicals
  - Purchasing link to alternatives
- Major cleanouts in FY07-09 yielded tons of abandoned materials and thousands of chemicals





# Energy & Fuel Management

- Energy Management Council chartered under EMS
- Seven short term initiatives focused on near term paybacks
- Renewable energy feasibility study with County
- Developed actionable energy management plan to meet the DOE goals (DOE O 430.2B, EO 13423, EISA 2007)

*Safety for You, Security for the Nation, Environment for our Future*





# Short Term Initiatives

- Condensate Line Repairs
- Steam Trap Survey
- Electric Meter Installation
- ESPC Contract Development
- E-85 Implementation
- Photovoltaic Streetlight Installation
- Building Integrated Photovoltaic Array Design
- Reduce/downsize LANL vehicle fleet



*Safety for You, Security for the Nation, Environment for our Future*



# Approved Action Plans

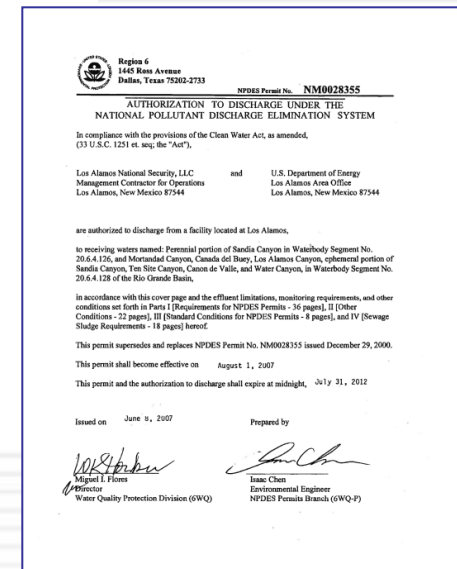
- Sustainable Development Standards and Implementation
- Energy & Water Use Efficiency Audits
- Energy Emergency Planning
- Energy Management Training
- Energy Usage & Metering
- Energy Use Reduction in Excluded Facilities (e.g. LANSCE, SCC)
- Energy Use Reduction in Regular Buildings
- Sustainability Planning in Construction Projects
- Fleet and Transportation
- Greenhouse Gas Emissions/Carbon Dioxide Reduction
- Water Reclamation and Reuse
- Water Use Reduction
- Green and Energy Star Procurement
- Guiding Principles in Existing Buildings (LEED Certification)

*Safety for You, Security for the Nation, Environment for our Future*



# Outfall Reduction Program

- LANL has industrial discharge of 154 million gallons per year from 15 permitted NPDES outfalls
- New EPA NPDES permit for LANL has restrictive discharge limits for metals, PCBs, and Whole Effluent Toxicity (WET).
  - Metals compliance by July 2010
  - PCB, WET compliance by July 2012
- New DOE O 430.2B (effective February 2008) requires sites across the complex to decrease potable water use by at least 16 percent by 2015.
- Organized into 5 geographical projects with funding ranging from local to approved line item (\$22-24 M total)





# Outfall Reduction Benefits

- 60-70% reduction in water use (Labwide)
- Decreased energy consumption
- Decreased operational expenses for new facilities
- Decrease water costs by over \$335,000 per year
- Mitigates expected increased water rates from county
- Improved environmental compliance





# Waste Reduction Strategy

- Ideas generated at local level via EMS Action Plans
- Institutional Funding through Generator Set Aside Fund - a tax on each unit of waste
  - Solid Waste GSAF
  - Liquid Waste GSAF
- Peer-reviewed selection process
- Awards programs to highlight successes

*Safety for You, Security for the Nation, Environment for our Future*



# Waste Reduction Projects

- Seal-less Vacuum Pump: LANSCE
  - Eliminated largest LLW source at LANSCE
- LED Lights for PF-4 room lighting
  - Expansion of LED use for glovebox lighting
- Dissolvable PPE
  - Pilots at LANSCE and TA 54; could reduce LLW by 300 m<sup>3</sup>
- Bismuth Bricks
  - Replaced 50 lead bricks with bismuth to avoid mixed low level waste
- BTF Laundry waste water improvements
  - Estimated reduction of 119,000 liters per year to RLWTF.
- RLW drain labels
  - Relabeled RLW and sanitary drains to prevent unintended discharges.

*Safety for You, Security for the Nation, Environment for our Future*



# Waste Reduction Projects

- Solvent Recovery for HPLC Processes
  - Reduced waste by over 95% and improved process safety without loss in performance.
- Sigma Electroplating Discharge Reduction
  - Effluent reduction of 850,000 liters year of rad liquid waste.
- Suspect Lead Recycle
  - Recycled/reused six drums of lead bricks and the three pallets of lead-lined and solid lead pigs
- Tank Recycling at LANSCE
  - This project yielded approximately 2430 ft<sup>3</sup> (55,000 lbs) of recycle metal
- Plasma Cleaning Processes
  - New oxygen plasma cleaning process eliminates MTRU stream and use of TCE.

*Safety for You, Security for the Nation, Environment for our Future*





# LANL P2 Award Results

*Safety for You, Security for the Nation, Environment for our Future*

- Recognizing 200 individuals on 40 different teams
- Environmental and cost benefit
  - 3 cubic meters of transuranic waste avoided
  - 16.5 cubic meters of mixed low level waste avoided or recycled
  - 116,188 kg hazardous waste reduced or avoided
  - 10,581 metric tons of solid waste reduced, reused or recycled
  - 385 cubic meters of low level waste avoided
  - 2,000,000 gallons of water use eliminated
  - 241,000 liters of radioactive liquid waste diverted from the Radioactive Liquid Waste Treatment Facility
  - 95,000 liters of high explosive waste water discharge eliminated
  - 99 tons of metal recycled
  - Hundreds of labor hours avoided
- Bottom Line: **\$5.9 million dollars in cost savings**





# Local Awards Feed NNSA Program

- Three NNSA Best-in-Class Awards:
  - Server Virtualization Results in Continual Cost and Energy Savings
  - Using a Mature EMS for Meaningful Institutional Improvements
  - MRAD: Pollution Prevention Plan Avoids Waste and Disposal Costs
- Five NNSA Stewardship Awards:
  - Downsizing and Right-sizing the Laboratory's Vehicle Fleet
  - A Green Synthesis Path the Explosive Diaminoazoxyfurazan
  - LED Replacement Lights for Glove Boxes are Safe and Cost Effective
  - Extending Reuse Period of Anti-C Lab Coats at CMR
  - Remediation Project Minimizes Waste and Saves \$2 Million



*Safety for You, Security for the Nation, Environment for our Future*



# Lessons Learned

- Integrating the EMS with existing systems has worked better than creating separate activities
  - Safety, security, audits, issues mgmt, emergency ops
- Continuous improvement at the worker level depend on seeing results
- ISO 14001 audit feedback has been invaluable in identifying new improvement targets
- Highlighting the successes breeds future successes
  - Annual awards, articles

*Safety for You, Security for the Nation, Environment for our Future*

